FAST Browser - 1.3 (64) | seems 2 | US 5552011 A | Tag: S | Doc: 35/64 | Format: KWIC

File Edit View Tools Window Help

	Document ID	Title
33	US 5714310 A	Photographic support compris
34	US 5710217 A	Extrudable thermoplastic hydr
35	US 5552011 A	Process of 3-layer co-extrude
36	US 5547822 A	Process for producing titanium

US-PAT-NO: 5552011

DOCUMENT-IDENTIFIER: US 5552011 A

Viewer

Times New Roman 12

ided biaxial oriented
ic paper

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Detailed Description Text - DETX (3):

The biaxial oriented polypropylene (BOPP) synthetic paper of the present invention is a 3-layer structure wherein the intermediate layer is extruded with the resin composite comprising high crystallizability PP of 70-80% weight over 97% isotacticity, calcium carbonate master batch of 14-10% weight, titanium dioxide master batch of 13-9% weight and static resistant agent of 3-1% weight by a primary extruder, and the two paper surface layers are extruded with the resin composite comprising PP of 30-55% weight polyethylene of 40-30% weight, titanium dioxide master batch of 26-14% weight, static resistant agent of 2-0.5% weight, adhesion resistant agent of 1-0.4% weight and UV absorbent of 1-0.1% weight by two secondary extruders. The extrudate co-flow from the said three extruders is extruded through same one T-type die to form a sheet of paper surface layer/intermediate layer/paper surface layer and then become a synthetic paper through biaxial orientation and corona discharge treatment.

Detailed Description Text - DETX (32):

The PP (MFI:2.0) of 76% weight, master batch of calcium carbonate(60%) of 13% weight, master batch of titanium dioxide(50%) of 9% weight and static resistant agent of 2% weight are mixed by a mixer and fed in one primary extruder. PP of 42% weight, polyethylene of 34% weight, master batch of titanium dioxide(50%) of 21% weight, static resistant agent of 1.5% weight, adhesion resistant agent of 1% weight and UV absorbent of 0.5% weight are mixed by a mixer and fed in two secondary extruders. Under the temperature

US005552011A

United States Patent [19]

Lin

[11] Patent Number: 5,552,011

[45] Date of Patent: Sep. 3, 1996

[54] PROCESS OF 3-LAYER CO-EXTRUDED BIAXIAL ORIENTED POLYPROPYLENE (BOPP) SYNTHETIC PAPER

[75] Inventor: Alice F. Lin, Taipei, Taiwan

[73] Assignee: Nanya Plastics Corporation, Taipei, Taiwan

[21] Appl. No.: 321,880

[22] Filed: Oct. 14, 1994

[51] Int. Cl.[6] B29C 55/10

[52] U.S. Cl. 156/244.17; 156/229; 264/414; 264/423; 264/469; 264/41; 264/154; 264/173.14; 264/173.15; 264/288.8

[58] Field of Search ..... 264/22, 290.2, 264/171, 288.8, 154, 414, 423, 469, 41, 173.15, 154, 173.14; 425/133.5, 131.1, 174.8 R, 174.8 R; 156/229, 244.17

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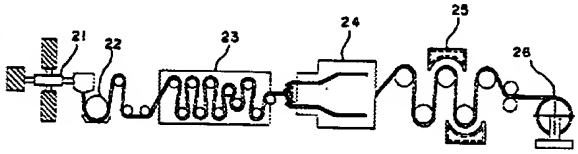
Primary Examiner—Jeffery R. Thurlow
Attorney, Agent, or Firm—Beveridge, DeGrandi, Weilacher & Young, L.L.P.

[57] ABSTRACT

The present invention is related to a process of manufacturing polypropylene (PP) synthetic paper and the product thereof, and particularly to a process of manufacturing synthetic paper by means of 3-layer co-extrusion wherein PP resin composite and resin composite are respectively extruded as an extrudate co-flow by one primary extruder and two secondary extruders and by same one T-type die so as to a paper sheet with a paper surface layer, an intermediate layer and a paper surface layer, and through cooling/shaping, biaxial orientation, corona discharge treatment and laminating/rolling to be a synthetic paper depending on the required thickness.

2 Claims, 3 Drawing Sheets



US-PAT-NO: 5552011

DOCUMENT-IDENTIFIER: US 5552011 A

TITLE: Process of 3-layer co-extruded biaxial oriented polypropylene (BOPP) synthetic paper

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Detailed Description Text - DETX (3):

The biaxial oriented polypropylene (BOPP) synthetic paper of the present invention is a 3-layer structure wherein the intermediate layer is **extruded** with the resin composite comprising high crystallizability PP of 70-80% weight over 97% isotacticity, **calcium carbonate master batch of 14-10% weight, titanium dioxide master batch** of 13-9% weight and static resistant agent of 3-1% weight by a primary extruder, and the two paper surface layers are **extruded** with the resin composite comprising PP of 30-55% weight polyethylene of 40-30% weight, **titanium, dioxide master batch** of 26-14% weight, static resistant agent of 2-0.5% weight, adhesion resistant agent of 1-0.4% weight and UV absorbent of 1-0.1% weight by two secondary extruders. The extrudate co-flow from the said three extruders is **extruded** through same one T-type die to form a sheet of paper surface layer/intermediate layer/paper surface layer and then become a synthetic paper through biaxial orientation and corona discharge treatment.

Detailed Description Text - DETX (32):

The PP (MFI:2.0) of 76% weight, **master batch of calcium carbonate(60%) of 13% weight, master batch of titanium dioxide**(50%) of 9% weight and static resistant agent of 2% weight are mixed by a mixer and fed in one primary extruder. PP of 42% weight, polyethylene of 34% weight, **master batch of titanium dioxide**(50%) of 21% weight, static resistant agent of 1.5% weight, adhesion resistant agent of 1% weight and UV absorbent of 0.5% weight are mixed by a mixer and fed in two secondary extruders. Under the temperature 200.degree.-280.degree. C. of extruders, these mixtures are **extruded** through same one T-type die in the manner of 3-layer co-**extrusion**. Under the temperature 15.degree.-60.degree. C. of cooling roller, PP paper sheet is cooled and shaped and then fed in the longitudinal orientation device for preheating at 120.degree.-150.degree. C. and 5-time longitudinal orientation

and then tempered and cooled. Next, the said paper is fed in the lateral orientation device for preheating at 150.degree.-185.degree. C. and 9-time lateral orientation and then tempered and coold to control its reducing rate. After lateral orientation, it is corona discharge treated to equip it with better printability, and finally it is rolled up by a rolling machine. The double-face PP synthetic paper with a thickness below 100.mu. produced according to the foregoing process is equipped with a fine printing analyticity and can be extensively used for writing, printing, packing and various purposes of paper. The physical property of PP synthetic paper with thickness of 60.mu. and 80.mu. produced according to this example is shown in Table 1.

Detailed Description Text - DETX (35):

To mix PP(MFI:4) of 75% weight, **master batch of calcium carbonate(60%) of 11% weight, master batch of titanium dioxide**(50%) of 11% weight and static resistant agent of 3% weight by a mixer and feed this mixture in one primary extruder, to mix PP of 37% weight, polyethylene of 37% weight, **master batch of titanium dioxide**(50%) of 23% weight, static resistant agent of 1.5% weight, adhesion resistant agent of 1% weight and UV absorbent of 0.5% weight by a mixer and feed this mixture in the first secondary extruders, and to mix PP(MFI:2.4) of 95% weight, static resistant agent of 3% weight and adhesion resistant agent of 2% weight by a mixer and feed this mixture in the second secondary extruder, to **extrude** all these mixtures through same one T-type die in the manner of 3-layer coextrusion under the extruder temperature 200.degree.-280.degree. C., and to cool and shape the PP synthetic paper sheet under the cooling roller temperature 15.degree.-60.degree. C. To feed the shaped paper sheet in the longitudinal orientation device for preheating at 120.degree.-150.degree. C. and 5-time longitudinal orientation and temper and cool it. To feed it in the lateral orientation device for preheating at 150.degree.-185.degree. C. and 8-time lateral orientation and to temper and cool it so as to control its reducing rate, and to roll up the said paper by a rolling machine after corona discharge treatment so as to give it a better printability. The single foggy face PP synthetic paper with a thickness below 100.mu. is for writing, printing and packing. The physical property of PP synthetic paper with thickness of 60.mu. and 80.mu. prepared according to the present example is shown in Table 1.

Detailed Description Text - DETX (38):

To mix PP(MFI:6) of 74% weight, **master batch of calcium carbonate(60) of 10% weight, master batch of titanium dioxide**(50%) of 13% weight and static resistant agent of 3% weight by a mixer and feed this mixture in one primary extruder, to mix PP of 40% weight, polyethylene pf 32% weight, **master batch of**

titanium dioxide(50%) of 24% weight, static resistant agent of 2% weight, adhesion resistant agent of 1% weight and UV absorbent of 1% weight by a mixer and feed this mixture in the first secondary extruder, and to mix PP(MFI:2.4) of 95% weight, static resistant agent of 3% weight and adhesion resistant agent of 3% weight by a mixer and feed this mixture in the second secondary extruder, to **extrude** all these mixtures through same one T-type die in the manner of 3-layer co-**extrusion** under the extruder temperature 200.degree.-280.degree. C., and to cool and shape the PP synthetic paper sheet under the cooling roller temperature 15.degree.-60.degree. C. To feed the shaped paper sheet in the longitudinal orientation device for preheating at 120.degree.-150.degree. C. and 5-time longitudinal orientation and temper and cool it. To feed it in the lateral orientation device for preheating at 150.degree.-185.degree. C. and 8-time lateral orientation and to temper and cool it so as to control its reducing rate, and to roll the said paper by a rolling machine after corona discharge treatment so as to give it a better printability. The single semi-foggy face PP synthetic paper with a thickness below 100.mu. is for writing, printing and packing which require only the single semi-foggy face paper. The physical property of PP synthetic paper with a thickness of 60.mu. produced according to this example is shown in Table 1.

Claims Text - CLTX (2):

(a) **extruding** by means of a primary extruder an intermediate layer from a first resin composition comprising 70-80% by weight of a high crystallinity polypropylene having over 97% isotacticity, 14-10% by weight of a **calcium carbonate master batch, 13-9% by weight of a titanium dioxide master batch,** and 3-1% by weight of a static resistant agent;

Claims Text - CLTX (3):

(b) **extruding** by means of two secondary extruders two paper surface layers from a second resin composition comprising 30-55% of polypropylene, 40-30% by weight of polyethylene, 26-14% by weight of a **titanium dioxide master batch,** 2-0.5% by weight of a static resistant agent, 1-0.4% by weight of an adhesion resistant agent, and 1-0.1% by weight of an UV absorbent;

EAST Browser - L3 (64) 1 same 2 | US 6376058 B1 | Tag: S | Doc: 19/64 | Format: KWIC

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	Document ID	Title
17	US 6514659 B1	Foam core imaging member w
18	US 6447976 B1	Foam core imaging element w
19	US 6376058 B1	Polypropylene based compost
20	US 6368543 B1	Process using single screw ex

US-PAT-NO: 6376058

DOCUMENT-IDENTIFIER: US 6376058 B1

Times New Roman 12

positions and films and labels

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Detailed Description Text - DETX (12):

The propylene compositions of the present invention may contain other additives to modify the properties of the composition. For example, colorants and mineral fillers may be included in the composition such as TiO.sub.2, CaCO.sub.3, talc, silica, mica, etc. The presence of small amounts of TiO.sub.2, for example, results in an opaque or white composition. Mineral fillers can be included in the propylene compositions in amounts of from about 1 to about 40% by weight, more often from about 5 to about 40% by weight. Other additives which may be included in the propylene compositions of the present invention include metal particles, fibers, flame retardants, antioxidants, heat stabilizers, light stabilizers, ultraviolet light stabilizers, antiblocking agents, processing aids, etc. LD 0011 as a white pigment masterbatch containing 25% of low density polyethylene, 25% calcium carbonate and 50% titanium dioxide. These materials are available from Ferro. Another useful pigment masterbatch comprises titanium dioxide dispersed in low density polyethylene. When a low density polyethylene matrix loaded with TiO.sub.2 (e.g., from about 20% to 70% TiO.sub.2) is added to the polymer blends, no "dusting" problem is seen, and this is a significant advantage. At the extrusion temperatures, the polyethylene matrix is in a sticky molten state and appears to bind the TiO.sub.2, preventing the TiO.sub.2 from coming to the surface to cause dusting. In one embodiment of the white formulations, a certain percentage of the acrylate copolymer (e.g., 10 to 25% w) is replaced by the polyethylene/TiO.sub.2 mixture to provide the desired opacity. An exemplary blend comprises 50% w of propylene polymer, 34% w of the acrylate copolymer and 16% of the polyethylene/Tio.sub.2 mixture.

US006376058B1

(12) **United States Patent**
Schut et al.

(10) Patent No.: US 6,376,058 B1
(45) Date of Patent: *Apr. 23, 2002

(54) **POLYPROPYLENE BASED COMPOSITIONS AND FILMS AND LABELS FORMED THEREFROM**

(75) Inventors: Johannes Schut, Alphen aan den Rijn; Coen van Tal, Mijdrecht, both of (NL); Mitchell J. Rackovan, Madison, OH (US); Paul C. McCaslin, Claremont; Eng-Pi Chang, Arcadia, both of CA (US)

(73) Assignee: Avery Dennison Corporation, Pasadena, CA (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No: 09/476,194

(22) Filed: Dec. 21, 1999

(51) Int. Cl.[7] C08L 23/12; B32B 27/32

(52) U.S. Cl. 428/220; 428/41.3; 428/910; 525/227

(58) Field of Search 525/227; 428/220, 423/910, 41.3

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Primary Examiner—David J. Buttner
(74) *Attorney, Agent, or Firm*—Reising, Ortiz, Reinelt & Shim, LLP

(57) **ABSTRACT**

A polypropylene based composition is described which comprises a mixture of (A) a propylene polymer or copolymer and (B) an ethylene-alkyl acrylate copolymer. These polypropylene based compositions are useful in the preparation of continuous films such as by extrusion, and the films can be oriented by stretching in the machine direction. The films prepared from the polypropylene compositions of this invention exhibit a variety of useful properties including the desired printability, stiffness, and die-cuttability to be useful as a facestock in preparing labels. Films prepared from the polypropylene based compositions of the invention also can be used as a base film, and the films can be overlaminated with a functional film. Machine-direction oriented monolayer and multilayer film facestocks for labels, and adhesive containing film labelstock for use in adhesive labels also are described. The present invention, in one embodiment, relates to the discovery that the films of the polypropylene compositions are useful as the facestocks in label applications. The clear films prepared from the polypropylene compositions of the invention also are useful for laminating over other polymer films and film facestocks to provide improved printability, die-cuttability and/or scuff resistance characteristics to the polymer films and facestocks.

33 Claims, 1 Drawing Sheet

US-PAT-NO: 6376058

DOCUMENT-IDENTIFIER: US 6376058 B1

TITLE: Polypropylene based compositions and films and labels formed therefrom

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Detailed Description Text - DETX (12):

The propylene compositions of the present invention may contain other additives to modify the properties of the composition. For example, colorants and mineral fillers may be included in the composition such as TiO.sub.2, CaCO.sub.3, talc, silica, mica, etc. The presence of small amounts of TiO.sub.2, for example, results in an opaque or white composition. Mineral fillers can be included in the propylene compositions in amounts of from about 1 to about 40% by weight, more often from about 5 to about 40% by weight. Other additives which may be included in the propylene compositions of the present invention include metal particles, fibers, flame retardants, antioxidants, heat stabilizers, light stabilizers, ultraviolet light stabilizers, antiblocking agents, processing aids, etc. LD 0011 as a white pigment masterbatch containing 25% of low density polyethylene, 25% calcium carbonate and 50% titanium dioxide. These materials are available from Ferro. Another useful pigment **masterbatch comprises titanium dioxide** dispersed in low density polyethylene. When a low density polyethylene matrix loaded with TiO.sub.2 (e.g., from about 20% to 70% TiO.sub.2) is added to the polymer blends, no "dusting" problem is seen, and this is a significant advantage. At the **extrusion** temperatures, the polyethylene matrix is in a sticky molten state and appears to bind the TiO.sub.2, preventing the TiO.sub.2 from coming to the surface to cause dusting. In one embodiment of the white formulations, a certain percentage of the acrylate copolymer (e.g., 10 to 25% w) is replaced by the polyethylene/TiO.sub.2 mixture to provide the desired opacity. An exemplary blend comprises 50% w of propylene polymer, 34% w of the acrylate copolymer and 16% of the polyethylene/Tio.sub.2 mixture.

single side sheet layer of thickness below 250 .mu.m can be manufactured by the above method, and used in various applications to instead kraft paper, art paper or releasing paper with PE film casted for coating substrate, furthermore it can be widely applied in printing, pen writing, and packaging application. The physical properties of BOPP synthetic paper with single side sheet layer in three different thickness of 80 .mu.m (see attached sample 1), 100 .mu.m (see attached sample 2), 120 .mu.m (see attached sample 3) made by this embodiment example are shown as following table.

Detailed Description Text - DETX (21):

BOPP synthetic paper with double side high gloss paper sheet layer of thickness 70 .mu.m, manufactured by adding large amount of inorganic powder PP resin (MFI=1.6) of 52% weight, antistatic agent of 3% weight, and **calcium carbonate masterbatch** of 45% weight are mixed and fed into the inlet of the single screw primary extruder with venting device. On the other way, PP resin (MFI=2.4) of 94% Weight, antistatic agent of 2% weight, antiblocking agent of 1% weight and ultraviolet absorbent of 2% weight are mixed by a mixer and fed into the inlet of No. 1, No. 2 single screw secondary extruder with venting device to knead and vent. In the meanwhile, at the extruder temperature of 200.about.280.degree. C., and vacuum degree to 700 mmHg, these mixtures are **extruded** through the same one T-die by means of three layer coextrusion. At the temperature of cooling rollers set at 15.about.60.degree. C., the PP coating sheet is cooled and shaped, then preheated at 120.about.150 .degree. C. and fed into the lateral orientation device for drawing 5.5 times in lateral orientation, then tempered and cooled, preheated to enter into a longitudinal orientation device whose temperature set at 150.about.185.degree. C. for drawing 9 times in longitudinal orientation, then tempered and cooled to control the good printability, coating and lamination of the thus obtained three layers synthetic paper, and taken up by winding device. The specific gravity of BOPP synthetic paper with double side sheet layer of thickness 70 .mu.m manufactured by the above method is extremely low, can be used to substitute package application of reinforced kraft paper bag, which is laminated with PE or PP woven bag in both side by casting PE layer thereon. The above mentioned reinforced kraft paper bag is usually used for the packaging of raw material., fertilizer and cement. The physical properties of BOPP synthetic paper with double side high gloss paper sheet layer of thickness 70 .mu.m (see attached sample 4)made by this embodiment example are shown as following table.

Detailed Description Text - DETX (24):

PP resin (MFI=1.6) of 52% weight, antistatic agent of 3% weight, and **calcium**

carbonate masterbatch of 45% weight are mixed and fed into the inlet of the single screw primary extruder with venting device. On the other way, PP resin (MFI=2.4) of 60% weight, antistatic agent of 2% weight, PE resin of 11% weight, **calcium carbonate masterbatch** of 20% weight, and titanium oxide masterbatch of 7% weight, are mixed by a mixer and fed into the inlet of No. 1, No. 2 single screw secondary extruder with venting device to knead and vent. In the meanwhile, at the extruder temperature of 200.about.280.degree. C., and vacuum degree to 750 mm Hg, these mixtures are **extruded** through the same one T-die by means of three layer coextrusion. At the temperature of cooling rollers set at 15.about.60.degree. C., the PP coating sheet is cooled and shaped, then preheated at 120.about.150.degree. C. and fed into the lateral orientation device for drawing 4.5 times in lateral orientation, then tempered and cooled, preheated to enter into a longitudinal orientation device whose temperature set at 150.about.190.degree. C. for drawing 9 times in longitudinal orientation, then tempered and cooled to control the good printability, coating and lamination of the thus obtained three layers synthetic paper, and taken up by winding device. The specific gravity of BOPP synthetic paper with double side matted paper sheet layer of thickness 70 .mu.m manufactured by the above method is extremely low, can be used for printing name card and front cover of book. The physical properties of BOPP synthetic paper with double side matted paper sheet layer of thickness 120 .mu.m (see attached sample 5) made by this embodiment example are shown as following table.

US-PAT-NO: 6126915

DOCUMENT-IDENTIFIER: US 6126915 A

TITLE: Titanium dioxide reduced in volatile water content, process for producing the same, and masterbatch containing the same

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Brief Summary Text - BSTX (2):

The present invention relates to titanium dioxide powder which has a low volatile moisture content and hence is free of the possibility that the quality is deteriorated due to generation of foams upon kneading processing into synthetic resin articles and the like, and to a method for manufacturing the same. Further, the present invention relates to a **masterbatch which contains the titanium dioxide** powder in a thermoplastic resin. The masterbatch is used when coloring and molding thermoplastic resins, is excellent in high speed and high temperature processability, and can be used for resin molded articles which are uniform and have excellent opacifying properties, particularly those for melt **extruded** laminate films.

Brief Summary Text - BSTX (27):

Further, the **masterbatch of the present invention includes those which contain titanium dioxide** obtained by the above-mentioned manufacturing methods. More specifically, the followings are included. (28) A **masterbatch comprising a thermoplastic resin containing therein titanium dioxide** having a volatile moisture content of 800 ppm or less at heat processing temperatures of 200 to 350.degree. C. by adding to titanium dioxide powder 0.01 to 0.5 wt % in terms of calcium dioxide of a calcium salt and/or 0.05 to 3.0 wt % of a silane coupling agent. (29) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated, together with the calcium salt and/or silane coupling agent, with 0.3 wt % or less in terms of alumina of an aluminate. (30) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated, after being treated by addition of the calcium salt, by addition of the silane coupling agent. (31) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated, after being treated by addition of the calcium salt, by addition of the aluminate, and then treated by addition of the silane coupling

agent. (32) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated, after being treated by addition of the aluminate, by addition of the silane coupling agent. (33) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated, after said titanium dioxide powder being converted to an aqueous slurry, by additon of said calcium salt and/or silane coupling agent to said slurry, or treated by addition of said aluminate therewith. (34) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated, after said titanium dioxide powder being fluidized with air stream, by addition of said calcium salt and/or silane coupling agent thereto, or by addition of said aluminate therewith. (35) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated using, as said calcium salt, calcium chloride, calcium bromide, calcium iodide or calcium nitrate. (36) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated using, as said silane coupling agent, methyltrimethoxysilane, .gamma.-glycidoxypropyltrimethoxy-silane, .gamma.-aminopropyltriethoxysilane, vinyltriethoxysilane, phenyltrialkoxysilane, or dialkyldialkoxysilane. (37) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated using 0.05 to 3.0 wt % of triethanolamine in place of said silane coupling agent. (38) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated using 0.01 to 0.5 wt % in terms of magnesium oxide of a magnesium salt in place of said calcium salt. (39) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated using, as said magnesium salt, magnesium sulfate, magnesium chloride, magnesium bromide or magnesium iodide. (40) A **masterbatch comprising titanium dioxide,** said titanium dioxide being treated using 0.3 wt % or less in terms of silica of a silicate in place of said aluminate. (41) A **masterbatch comprising titanium dioxide,** said titanium dioxide being, after said surface treatment, dried or pulverized at temperatures of 200.degree. C. or higher. (42) A **masterbatch comprising titanium dioxide,** said titanium dioxide being, after said drying, pulverized in the presence of an organic dispersant. (43) A masterbatch, wherein said organic dispersant is at least one of silane coupling agents, titanium coupling agents, silicone oil, polyhydric alcohols, alkyldisilazanes, and alkanolamines. (44) A masterbatch, wherein said volatile moisture content is 1,200 ppm or less at temperatures of 280 to 350.degree. C. (45) A masterbatch, wherein said masterbatch is one for use in a melt **extrusion** laminate film.

US-PAT-NO: 5824462

DOCUMENT-IDENTIFIER: US 5824462 A

TITLE: Resin-coated paper

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Detailed Description Text - DETX (120):

Subsequently, the obverse side of the base paper was subjected to corona discharge treatment and then melt **extrusion** coating with a resin composition consisting of 20 parts by weight of a **titanium dioxide pigment master batch** consisting of 47.5% by weight of a low-density polyethylene resin (density 0.920 g/cm.sup.3, MFR=8.5 g/10 min), 50% by weight of an anatase type titanium dioxide pigment surface-treated with hydrated aluminum oxide (0.75% by weight in terms of Al.sub.2 O.sub.3 relative to the weight of titanium dioxide) and 2.5% by weight of zinc stearate, 65 parts by weight of a low-density polyethylene resin (density 0.920 g/cm.sup.3, MFR=4.5 g/10 min), and 15 parts by weight of a high-density polyethylene resin (density 0.970 g/cm.sup.3, MFR=7.0 g/10 min), in each resin coating weight described in Table 4 at a resin temperature of 320.degree. C. and a running rate of the base paper of 150 m/min to form a second resin layer. The melt **extrusion** coatings with polyethylene resin on the obverse side and reverse side were carried out a so-called tandem method in which the **extrusion** coatings were carried out one after another. In this case, the surface of the second resin layer containing the titanium dioxide pigment of the resin-coated paper was processed into a glossy surface and the surface of the first resin layer was processed into a mat surface like a paper surface.

Detailed Description Text - DETX (163):

Subsequently, the obverse side of the base paper was subjected to corona discharge treatment and then melt **extrusion** coating with a resin composition consisting of 20 parts by weight of a **titanium dioxide pigment master batch** consisting of 47.5% by weight of a low-density polyethylene resin (density 0.920 g/cm.sup.3, MFR=8.5 g/l0 min), 50% by weight of an anatase type titanium dioxide pigment surface-treated with hydrated aluminum oxide (0.75% by weight in terms of Al.sub.2 O.sub.3 relative to the weight of titanium dioxide) and 2.5% by weight of zinc stearate, 65 parts by weight of a low-density

US-PAT-NO: 6368543

DOCUMENT-IDENTIFIER: US 6368543 B1

TITLE: Process using single screw extruder for producing a three layer co-extrusion biaxially oriented polypropylene synthetic paper of thickness 25.about.250 .mu.m

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Brief Summary Text - BSTX (9):

Upon consideration of the dispersion problem of **inorganic powder used in the single screw extruder, only masterbatch ready made by dispersing the inorganic powder** with resin can be used. The masterbatch mixes with the polypropylene resin in the inlet of the extruder, then enters into the extruder to melt and **extrude**. To obtain the dispersion of the **inorganic powder in the production of the masterbatch,** it is usual to use a dispersing agent such as coupling agent, calcium stearate to enhance surface treatment of the inorganic powder, to obtain much better productivity (to avoid film break in the drawing zone)and product appearance, evenness of BOPP synthetic paper. But the **masterbatch containing the inorganic powder** with dispersing agent incurred and moisture adsorbed may volatilize its dispersing agent and moisture into gas under high temperature kneading by the screw in the extruder. This will cause voids to be formed in the sheet during cooling after **extrusion**. The existing voids also form gas bubble in the product of latter zone drawing. It is necessary to control the formulation condition and processing condition.

Brief Summary Text - BSTX (29):

The PP resin composition used for foamed intermediate layer is **extruded** by one single screw primary extruder with venting device. The PP resin composition which was composed of the polypropylene (PP) resin of 30.about.96% weight having high crystallinity of isotacticity above 97%, antistatic agent of 1.about.5% weight, **calcium carbonate masterbatch** 3.about.50% weight, and titanium oxide masterbatch 0.about.15% weight is uniformly blended into front side of the single screw extruder, and the volatile gas incurred in the PP resin composition can be expelled by the venting device. The PP resin composition was blended to melt toward the intermediate runner of the T-die. While the PP resin composition used for the paper sheet layer or resin layer

are **extruded** by two single screw secondary extruders with venting devices. The PP resin composition which was composed of the polypropylene (PP) resin of 40.about.100% weight, polyethylene resin of 0.about.20% weight, antistatic agent of 0.about.5% weight, **calcium carbonate masterbatch** of 0.about.35% weight, titanium oxide masterbatch of 0.about.20% weight, antiblocking agent of 0.about.5% weight and ultraviolet ray absorber of 0.about.5% weight is fed into inlet in the front side of the two single screw secondary extruders with venting devices and uniformly blended, and the volatile gas incurred in the PP resin composition can be expelled by venting device. The PP resin composition was blended to melt toward the two outer runner of the T-die. The three extrudates **extrude** from the three single screw extruders were co-flowed through the same T-die in the way of three layer co-**extrusion** to form the coating sheet of paper sheet layer or resin layer/foamed intermediate layer/paper sheet layer or resin layer. Then, the said coating sheet was subjecting to biaxial orientation, corona treatment, winding to form a three layer co-**extrusion** BOPP synthetic paper of thickness 25.about.250 .mu.m with double side, single side paper layer or double side resin layer with high gloss.

Detailed Description Text - DETX (19):

BOPP synthetic paper with single side paper sheet layer of thickness below 250 .mu.m (samples 1,2,3 enclosed) PP resin (MFI=2.0)of 69% weight, antistatic agent of 3% weight, **calcium carbonate masterbatch** of 20% weight, and titanium oxide masterbatch of 8% weight are mixed and fed into the inlet of the single screw primary extruder with venting device. On the other way, PP resin (MFI=2.4) of 60% weight, PE(Polyethylene) resin(MFI=1) of 11% weight, antistatic agent of 2% weight, antiblocking agent of 1% weight, titanium oxide **masterbatch of 5% weight, calcium carbonate masterbatch** of 20% weight, and ultraviolet absorbent of 1% weight are mixed by a mixer and fed into the inlet of No. 1 single screw secondary extruder with venting device to knead and vent, in the meanwhile, PP resin (MFI=2.4) of 97% weight, antistatic agent of 3% weight are mixed and fed into the inlet of No. 2 single screw secondary extruder with venting device to knead. At the extruder temperature of 200.about.280.degree. C., these mixtures are **extruded** through the same one T-die by means of three layers coextrusion. At the temperature of cooling rollers set at 15.about.60.degree. C., the PP coating sheet is cooled and shaped, then preheated at 120.about.150.degree. C. and fed into the lateral orientation device for drawing 5 times in lateral orientation, then tempered and cooled, preheated to enter into a longitudinal orientation device whose temperature set at 150.about.185.degree. C. for drawing 9 times in longitudinal orientation, then tempered and cooled to control the good printability, coating and lamination of the thus obtained three layers synthetic paper, and taken up by winding device BOPP synthetic paper with

polyethylene resin (density 0.920 g/cm.sup.3, MFR=4.5 g/10 min), and 15 parts by weight of a high-density polyethylene resin (density 0.970 g/cm.sup.3, MFR=7.0 g/10 min), to a resin thickness of 32 .mu.m at a resin temperature of 320.degree. C. and a running rate of the base paper of 150 m/min. The melt **extrusion** coatings with polyethylene resin on the obverse side and reverse side were carried out by a so-called tandem method in which the **extrusion** coatings were carried out one after another. In this case, the surface of the second resin layer containing the titanium dioxide pigment of the resin-coated paper was processed into a glossy surface and the surface of the first resin layer was processed into a mat surface like a paper surface.

Detailed Description Text - DETX (204):

Subsequently, the obverse side of the base paper was subjected to corona discharge treatment and then melt **extrusion** coating with a resin composition consisting of 20 parts by weight of a **titanium dioxide pigment master batch** consisting of 47.5% by weight of a low-density polyethylene resin (density 0.920 g/cm.sup.3, MFR=8.5 g/10 min), 50% by weight of an anatase type titanium dioxide pigment surface-treated with hydrated aluminum oxide (0.75% by weight in terms of Al.sub.2 O.sub.3 relative to the weight of titanium dioxide) and 2.5% by weight of zinc stearate, 65 parts by weight of a low-density polyethylene resin (density 0.920 g/cm.sup.3, MFR=4.5 g/10 min), and 15 parts by weight of a high-density polyethylene resin (density 0.970 g/cm.sup.3, MFR=7.0 g/10 min), to a resin thickness of 32 .mu.m at a resin temperature of 320.degree. C. and a running rate of the base paper of 150 m/min. The melt **extrusion** coatings with polyethylene resin on the obverse side and reverse side were carried out by a so-called tandem method in which the **extrusion** coatings were carried out one after another. In this case, the surface of the second resin layer containing the titanium dioxide pigment of the resin-coated paper was processed into a glossy surface.